

Claims

- [c1] A method of evaluating changes for a wellbore interval, comprising:
 - obtaining first log data acquired by a logging sensor (8, 5, 6, 3) during a first pass over the wellbore interval;
 - obtaining second log data at a time later than the first log data, said second log data being acquired by the logging sensor during a second pass over the wellbore interval;
 - calculating a plurality of delta values between the first log data and the second log data;
 - deriving an observed effect using the plurality of the delta values; and
 - identifying a correlation between the observed effect and a causal event.
- [c2] The method of claim 1, further comprising displaying the correlation on a display device (82).
- [c3] The method of any of claims 1-2, wherein the logging sensor measures at least one parameter selected from the group consisting of gamma ray, resistivity, neutron porosity, density, ultrasonic caliper, and sigma.
- [c4] The method of any of claims 1-3, wherein the logging sensor is disposed on an integrated measurement tool.
- [c5] The method of any of claims 1-4, wherein the correlation is a depth correlation.
- [c6] The method of any of claims 1-5, wherein the correlation is a time correlation.

- [c7] The method of claim 1, further comprising:
 - calculating a relative effect using a sensitivity factor to adjust the correlation; and
 - displaying the correlation and the relative effect on a display device (82).
- [c8] A system for evaluating changes for a wellbore interval comprising:
 - a well log data acquisition system (7) for acquiring first log data and second log data, at a time later than said first log data, from a logging sensor (8, 5, 6, 3) during a plurality of passes over the wellbore interval; and
 - a well log data processing system (72,74, 76) for:
 - calculating a plurality of delta values between the first log data and the second log data;
 - deriving an observed effect using the plurality of the delta values;
 - and
 - identifying a correlation between the observed effect and a causal event.
- [c9] The system of claim 8, further comprising a display device (82) for displaying the correlation.
- [c10] The system of any of claims 8-9, wherein the logging sensor measures at least one parameter selected from the group consisting of gamma ray, resistivity, neutron porosity, density, ultrasonic caliper, and sigma.
- [c11] The system of any of claims 8-10, wherein the logging sensor is disposed on an integrated measurement tool.
- [c12] The system of any of claims 8-11, wherein the correlation is a depth correlation.

- [c13] The system of any of claims 8-12, wherein the correlation is a time correlation.
- [c14] The system of claim 8, further comprising a well log data processing system (72, 74, 76) for calculating a relative effect using a sensitivity factor to adjust the correlation; and displaying the correlation and the relative effect on a display device.
- [c15] A computer system for evaluating changes for a wellbore interval, comprising:
 - a processor (72);
 - a memory (74);
 - a storage device (76);
 - a computer display (82); andsoftware instructions stored in the memory for enabling the computer system under control of the processor, to perform:
 - gathering first log data from a logging sensor during a first pass over the wellbore interval;
 - gathering second log data, at a time later than said first log data, from the logging sensor during a second pass over the wellbore interval;
 - calculating a plurality of delta values between the first log data and the second log data;
 - deriving an observed effect using the plurality of the delta values;
 - identifying a correlation between the observed effect and a causal event; and
 - displaying the correlation on the computer display.